UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
101 MARIETTA STREET, N.W.
ATLANTA, GEORGIA 30323

Report Nos.: 50-280/85-20 and 50-281/85-20

Licensee: Virginia Electric and Power Company
Richmond, VA 23261

Docket Nos.: 50-280 and 50-281 License Nos.: DPR-32 and DPR-37

Facility Name: Surry 1 and 2

Inspection Conducted: May 31 - June 10, 1985

Inspectors: L. S. Mellen 6/27/85
L. S. Mellen Date Signed

J. B. Macdonald 6/27/85
J. B. Macdonald Date Signed

Approved by: Frank Jape 6/27/85
Frank Jape, Section Chief Date Signed
Engineering Branch
Division of Reactor Safety

SUMMARY

Scope: This routine, unannounced inspection entailed 230 inspector-hours on site in the areas of procedure review and witnessing the 10 CFR 50 Appendix J Type A, B, and C leak rate testing.

Results: No violations or deviations were identified.

REPORT DETAILS

1. Persons Contacted

Licensee Employees

*H. L. Miller, Assistant Station Manager (NS&L)
*D. L. Benson, Assistant Station Manager (O&M)
*R. H. Blount, Supervisor Performance and Technical
R. Allen, Reactor Operator
E. J. Turko, Engineer

Other licensee employees contacted included construction craftsmen, engineers, technicians, operators, mechanics, and office personnel.

Other Organizations

Stone and Webster
*R. I. Samson, Engineer

NRC Resident Inspectors

*D. Burke, Senior Resident Inspector
*M. Davis, Resident Inspector

*Attended exit interview

2. Exit Interview

The inspection scope and findings were summarized on June 10, 1985, with those persons indicated in paragraph 1 above. The inspector described the areas inspected and discussed in detail the inspection findings. No dissenting comments were received from the licensee. The following inspector followup items were identified:

a. IFI (280/85-20-01) Revision of Technical Specification to permit an imposed leakage verification test for Appendix J, Type A testing.

b. IFI (280/85-20-02) Improvement in data acquisition and data/time correlation for ILRT.

The licensee did not identify as proprietary any of the materials provided to or reviewed by the inspectors during this inspection.

3. Licensee Action on Previous Enforcement Matters

This subject was not addressed in the inspection.

4. Unresolved Items

Unresolved items were not identified during the inspection.

5. Type A Test Sequence and Description (61719)(90713)

Pressurization of containment was started at 0145 hours on June 7, 1985. After resolving containment air recirc fan problems, a containment pressure of 61.557 psia was achieved at 1338 hours. Containment stabilization criterion was met at 1750 hours. During pressurization, stabilization and the next seven hours an extensive leakage investigation revealed only minor seat or packing leakage on the following valves:

MOV-2289A	(Penetration X-15)
TV-SI-200B	(Penetration X-53)
TV-VA-203A	(Penetration X-57B)
2-DG-1	(Penetration X-33)
2-RM-6	(Penetration X-43)
2-RM-12	(Penetration X-44)
2-IA-977	(Penetration X-47)
2-IA-992	(Penetration X-47)
2-SI-212	(Penetration X-53)
I-IA-702	(Penetration X-58)
I-IA-703	(Penetration X-58)
I-IA-704	(Penetration X-58)

Pressurization checks on the Mainsteam lines revealed:

A	5.9	psig
B	0	psig
C	0	psig

At 2235 hours, the walkdown of electrical penetration area indicated penetration 3C increasing in pressure to approximately 31 psig. However, there was no measurable through penetration leakage.

At 2310 hours, chilled mirror #10 was removed from service due to erratic readings. The inspector noted this chilled mirror had failed during the previous ILRT. The licensee indicated this mirror would not be used during future ILRTs.

At 0100 hours on June 8, 1985, having performed an extensive leakage evaluation, the licensee met the containment stabilization criteria as established in BN-TOP-1 1972 Revision 1, Section 2.3.A.1. The rate of change of average temperature was less than 1.0°F/hour when averaged between 2300 hours on June 7 and 0100 hours on June 8.

At 1430 hours on June 8, the ILRT met all criteria established in BN-TOP-1 Section 2.3.B, for test termination as noted below:

Criteria B.1 The trend report based on total time calculations was less than maximum leakage rate allowable (Note: BN-TOP-1 Section 2.3.B.1, indicates the maximum allowable leakage is La. However, 10 CFR 50 Appendix J, which was issued subsequent to BN-TOP-1, reduces this to 0.75La. In cases where there is conflict between test methods and the regulations, the regulations govern).

Criteria B.2 The end of test upper confidence limit for the calculated leak rate based on total time was less than 0.75La (note discussion in Criteria B.1) including the as-found leakage and the type B and C leakage penalties.

Criteria B.3 The mean of the measured leak rates based on total time calculations over the last points was below 0.75La (note discussions in Criteria B.1).

Criteria B.4 Data was recorded at equal 20 minute intervals (note discussion on data acquisition Section 9).

Criteria B.5 The 13.5 hour test provided more than the minimum (20) data sets required by BN-TOP-1.

Criteria B.6 The test duration of 13.5 hours exceeded the minimum requirements of BN-TOP-1.

Criteria C.1 At 1835 hours, stabilization for the superimposed verification test was completed. The stabilization period of four hours exceeded the one hour requirement of BN-TOP-1.

Criteria C.2 The verification test duration was 9.5 hours, was concluded at 0530 hours on June 9, 1985, and exceeded the minimum required duration of 6.75 hours.

Criteria C.3 The resulting measured verification leakage agreed within 25% of the calculated leakage.

SYNOPSIS OF UNIT TWO

TYPE A TEST JUNE 8 - 10, 1985

Time Hours	Date	
0145	(6/8)	Containment pressurization began
1338	(6/8)	Pressurization was secured

1350	(6/8)	Started containment stabilization
2310	(6/8)	Removed chilled mirror #10 from service
0100	(6/9)	ILRT began
1430	(6/9)	Ended ILRT
1646	(6/9)	Began verification test stabilization
1835	(6/9)	Superimposed verification stabilization completed, verification began
0530	(6/10)	Superimposed verification completed
0830	(6/10)	Depressurization began

6. Supplemental Test Technical Specification 4.4

During discussions of acceptable methods for performing the supplemental test, the licensee pointed out that Technical Specification 4.4 states that the makeup air method will be used for the supplemental test. The Technical Specification further states that the leak rate test will be performed in accordance with Appendix J to 10 CFR 50 which recommends that the imposed leak rate method specified in ANSI N45.4 be used for the supplemental test. In a case where regulations conflict with Technical Specifications the regulations, being a higher level document, will govern unless the Technical Specification is identified as an exemption to the regulation. The inspectors concluded that the licensee's Technical Specification will permit the use of the imposed leak rate method for performing the supplemental test.

The licensee indicated that this ambiguity will be clarified in a future Technical Specification submittal. This was identified as Inspector Followup Item IFI (280/85-20-01).

7. As-Found Leak Rate (61719)

A preliminary analysis of the as-found type A leakage rate was provided to the inspectors. The results are summarized below:

Penetration No.	Inside	Outside	Net Leakage SCFH
7 Safety Injection	-	68.7	0
21 Safety Injection	-	3.2	0.0
28 Chemical & Vol. Control	222.0	1.39	1.39
33 Gaseous Drains	101.0	0.0	0.0
38 Aerated Drains	20.655	188.0	20.655
43 Air Monitoring	1.947	0.0	0.0

46 Charging	-	1.05	0.0
47 Instrument Air	12.203	0.0	0.0
50 Safety Injection	0.435	-	0.435
53 Safety Injection	0.0	1.6584	0.0
56A Liquid Sample	3.323	2.7926	2.7926
56B Liquid Sample	0.131	0.238	0.131
56D Liquid Sample	1.5	1.088	1.088
57A Leakage Mon.	0.74	4.47	0.74
57D Sample System	0.0	5.76	0.0
58 Instrument Air	0.966	0.0	0.0
63 Cont. Spray	0.0	0.52	0.0
64 Cont. Spray	0.0	1.3	0.0
71 Recirc. Spray	0.0	2.21	0.0
89 Air Ejec. Dsch.	8.29	0.0	0.0
90 Ventilation	0.0	8.139	0.0
91 Ventilation	0.3	0.3	0.3
92 Cont. Vacuum	-	1.21	1.21
93 Cont. Vacuum	-	4.92	4.92
101 Fire Prot.	-	0.0	0.0
113 Safety Injection	-	1.52	0.0

Penetrations not listed had zero leakage.

The as-found local leakage rate test results indictaed a total leakage of 33.6 SCFH or 0.011 wt%/day. The pathways that were identified in the September 1983, test as having leakage of greater than 40 SCFH had measured leakage below 40 SCFH during this test. The results were as follows:

Penetration No.	Net Leakage SCFH
38 Aerated Drums	20.655
46 Charging	0.0
69 Recirculation Spray	0.0

Based on the preliminary analysis discussed above, the inspectors concluded that the licensee had demonstrated that the as-found containment leakage meets the Appendix J leakage of 0.075 wt%/day.

The licensee has adequately addressed the as found leakage from type B and C tests. This closes IFI 281/83-27-01.

8. As Left Leak Rate (61720)

The preliminary analysis of As-Left local leak rate data indicated the as-left leakage was less than 31 SCFH. This was well below the limit of 0.6La. The individual valve and penetration data is tabularized below:

Penetration No.	Valve No.	Leak Rate (SCFH)	Penetration Leakage (SCFD)
7	2-SI-150	(A)	
	MOV-2867 C&D	3.3	79.2
15	2-CH-309	0.29	
	MOV-2289A	0.307	7.368
19	MOV-2381	0	0
20	2-SI-32	0	0
21	MOV-2842	0	0
23	MOV-2869B	0.24	5.76
24	MOV-RH-200	0	0
28	HCV-2200A,B,C	0.72	
	TV-2204	1.5	36.0
32	TV-GW-203	0	
	TV-GW-202	0	0
33	TV-DG-208A	0	
	TV-DG-208B	0.115	2.76
38	TV-DA-200A	0.145	
	TV-DA-200B	0.182	4.37
42	2-SA-81	0	
	2-SA-82	0	0
43	2-RM-3	0.013	
	TV-RM-200A	0.068	1.632
44	TV-RM-200B	0	
	TV-RM-200C	0	0
45	2-RC-160	0	
	TV-2519A	0	0
46	FCV-2160	0.25	6.0
47	2-IA-864	0.027	
	TV-IA-200	0.0169	
	2-IA-704	0	0.648
48	TV-VG-209A	0	
	TV-VG-209B	0	0
50	TV-SI-201A	0.085	
	TV-SI-201B	0.35	8.4
51	2-SW-206	0	
	2-SW-208	0.023	0.55
53	TV-SI-200	0.0416	
	2-SI-234	0	1.0
54	2-VA-1	0	
	2-VA-9	0	0
55D	TV-LM-200E	(B)	
57C	TV-LM-200G	(B)	

97C	TV-LM-200A	(B)	
105B	TV-LM-200C	0	0
55D	TV-LM-200F	(C)	
57C	TV-LM-200H	(C)	
97C	TV-LM-200B	(C)	
105B	TV-LM-200D	0	0
56A	TV-SS-206A	0.027	
	TV-SS-206B	0.0074	0.648
56B	TV-SS-202A	0.034	
	TV-SS-202B	0.075	1.8
56D	TV-SS-200A	0	
	TV-SS-200B	0.112	2.69
57A	TV-SS-201A	0	
	TV-SS-201B	0.03	0.72
57B	TV-DA-203A	0	
	TV-DA-203B	0	0
57D	TV-SS-204A	0	
	TV-SS-204B	0.10	2.4
58	2-LA-868	0	
	1-IA-704	0	0
60	MOV-2890A	5.2	124.8
61	MOV-2890C	1.3	31.2
62	MOV-2890B	0	0
63	2-CS-24	1.0	
	MOV-CS-201C,D	0.48	24.0
64	2-CS-13	1.0	
	MOV-CS-201A,B	0	24.0
66,69	MOV-RS-255A&B	0.69	16.6
68,67	MOV-2860A&B	5.0	120.0
70	2-RS-11	0.9	
	MOV-RS-256B	3.78	90.72
71	2-RS-17	0	
	MOV-RS-256A	1.63	39.12
89	2-VP-12	0.43	
	TV-SV-202A	0	10.32
90	MOV-VS-200C	(D)	
	MOV-VS-200D&201	.461	11.064
91	MOV-VS-200A	(E)	
	MOV-VS-200B&202	2.0	48.
92	TV-CV-250C	0.29	
	TV-CV-250D	0.29	
	TV-GW-204	0	
	TV-GW-205	0	6.96
93	TV-GW-200	0	
	TV-GW-201	0	
	TV-CV-250A	0.082	
	TV-CV-250B	0.18	4.32
94	HCV-CV-200	0.20	
	2-CV-2	0.083	4.8

97B	TV-SS-203A	0.0185	
	TV-SS-203B	0.0452	1.085
100	TV-GW-206	0	
	TV-GW-207	0	0
101	2-FP-151	0	
	2-FP-152	0	0
103	2-RL-3	(F)	
	2-RL-5	0	0
104	2-RL-13	0	
	2-RL-15	0	0
105C	TV-GW-211A	0	
	TV-GW-211B	0	0
106	2-SI-73	0	0
112	TV-LA-201A	0	
	TV-LA-201B	0	0
113	2-SI-174 & MOV-2869A	0.58	13.92

(A) included with valves MOV-2867 C&D
(B) included with valve TV-LM-200C
(C) included with valve TV-LM-200D
(D) included with valves MOV-VS-200D & 201
(E) included with valves MOV-VS-200B & 202
(F) included with valve 2-RL-5

9. Data Acquisition

The process of determining current leakage rate values via corporate computer in Richmond appeared awkward. It involved reading data from a plant process computer, transcribing the data on the logs, hand entering the data on a terminal tied by phone line to the corporate computer in Richmond and waiting for the information to return from the corporate computer. During the test, data was completely or partially reentered several times due to Richmond's computer problems. There were periods that the leak rate determination was delayed more than an hour. In addition, the plant process computer was not printing out the correct times for various data sets this required manual entry of time on log sheets. The licensee has agreed to correct the computational problems before the next ILRT. This was Identified as inspector Followup Item (280/85-20-02): Improvement in data acquisition and data/time correlation for ILRT.

10. Valve Alignment Verification

The inspectors selected a sample population of containment piping system penetrations. The containment isolation valves of these penetrations were inspected to ensure that the valves were tagged out and that the valves were in the proper test position. PT 16.3 Reactor Containment Building Integrated Leak Rate Test procedure was reviewed to confirm that double independent verification sign-off for valve location and test position was performed. In addition, the inspector reviewed the control room tag-out

distribution list for motor operated valves and inspected the individual valve controller switches to ensure that each was tagged-out to prevent inadvertent actuation during the test. The penetrations and valves reviewed are identified below.

Valve Position Verification

PENETRATION 61 - Low Head Safety Injection Disch.

2 SI 179 (1) *
2 SI 189 (1) *
MOV 289 OC

PENETRATION 63 - Containment Spray Pump Disch.

2 CS 70
MOV-CS-201 C
MOV-CS-201 D

PENETRATION 64 - Containment Spray Pump Disch

2-CS-63(1) *
MOV-CS-201A
MOV-CS-201B

PENETRATION 70 - Recircuration Spray Pump D

2-RS-8
2-RS-25(1) *
2-RS-33(1) *
MOV-RS-256B

PENETRATION 71 - Recirc Spray Pump Disch.

2-RS-10
2-RS-80(1) *
2-RS-81(1) *
2-RS-85(1) *
MOV-RS-256A

PENTRATION 89 - Air Ejector Disch. to Containment

2-VP-186(1) *
TV-SV-202A

PENETRATION 90 - Containment Purge Exhaust Line

2-VS-225(1)
MOV-VS-200 C (inside cont.)**
MOV-VS-200 D
MOV-VS-201

PENETRATION 91 - Ventilation System

2-VS-256(1) *
MOV-VS-200A (inside cont) **
MOV-VS-200B
MOV-VS-202

PENETRATION 106 - Safety Injection Test Line

2-SI-73
2-SI-182(1) *
2-SI-184(1) *
2-SI-223(1) *
HCV-285OA (inside cont) **
HCV-285OB (inside cont) **
HCV-285OC (inside cont) **
HCV-285OD (inside cont) **
HCV-285OE (inside cont) **
HCV-285OF (inside cont) **

* (1) indicates nipple was teflon taped and capped
** valves inside containment

Of the sample penetrations inspected all valves were found to be tagged-out and in the proper test position. Double independent verification sign-off for valve location and correct test position was complete as per procedure P.T. 16.3. The sample motor operated valves were identified on the control room tag-out distribution list and each individual controller switch for these valves was properly tagged out.

11. Procedure Review

a. 2-PT 16.3 Attachment 7.16

Attachment 7.16, Superimposed Leakage Verification Test, adequately covers the verification criteria for both the 24 hour type A test and the shorter duration test (BN-TOP-1 Rev. 1). The acceptance criteria described meets or exceeds the requirements of the 24 hour test and the shorter duration test. The valve alignment and piping configuration appeared adequate to ensure an accurate verification test. The verification test required a minimum number of data sets and test duration to ensure statistical accuracy. The equations used for calculation of leakage rate were correct and the accuracy of the methodology employed was within the requirements of 10 CFR 50 Appendix J.

b. The inspectors reviewed Surry Power Procedure ADM-60, in particular Section 5.2, New Procedure Preparation, and Section 5.8.8, Periodic Test Procedures, to check conformance of new procedures PT.16.3 and 2 PT-16.4. Revised procedures PT-16.3 Reactor Containment Building Integrated Leak Rate Test (Type "A") and 2-PT-16.4 Containment

Isolation Valve Leakage (Type C testing) were found to be in conformance with the applicable requirements of the sections of ADM-60.

Within the areas examined, no violations or deviations were identified.